AIRS Version 6 at the GES DISC: Processing, New Related Products, and Giovanni

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Outline

- Version 6 Processing Status
- New Related Products
  - Sounder PEATE
  - Level 3 Lite
  - Climatology
- Giovanni-4

Version 6 Processing Status

- Processing is Complete for AIRS+AMSU and AIRS-Only
- We will go back to check for any missing granules
- Minor reprocessing of L2 and L3 following June 2013 look-up table update
- Version 6 AIRS+AMSU+HSB will proceed when the algorithm is ready
- Version 6 CO_2

Sounder PEATE Data

- Simultaneous Nadir Observation (SNO) Data are available. These Monthly near nadir match-ups between AIRS, IASI, CrIS, AMSU, ATMS, and MHS and available by ftp and will soon be searchable in Mirador.
  - ftp://airsl2.gesdisc.eosdis.nasa.gov/ftp/data/s4pa/Sounder_PEATE
  - Infrared Sub-directories: SPSNI[01-05]M
  - Microwave Sub-directories: SPSNM[01-14]M
  - More details are in the README file located in the "doc" sub-directories.
- Calibration Subsets and Level 3 will be added in the coming months

V6 Level 3 files are much larger

Level 3 Statistical variables	
Mean	V5 and V6
Counts	V5 and V6
Standard Deviation	V5 and V6
Error Estimates	V5 (some variables) V6 (most variables)
Minimum	V6
Maximum	V6
Grids	
Ascending/Descending	V5 and V6
Ascending/Descending_mw_only	V5 and V6
Ascending/Descending_TqJoint	V6

V5 files have 268 variables

V6 files have 785 variables

V6 Level 3 files are much larger

File	Number of Variables	Size (Megabytes)
Version 5 RetStd001 2002.09.06	268	76
Version 6 RetStd001 2002.09.06	785	400

The larger Version 6 files take longer to download, read, and manipulate with analysis tools.

A Level 3 lite product might be easier to use.

V6 Level 3 Lite Product

File	Number of Variables	Size (Megabytes)
Version 5 RetStd001 2002.09.06	268	76
Version 6 RetStd001 2002.09.06	785	400
Version 6 “Lite” ascending and descending only	375	183
Version 6 “Lite” ascending, descending, mean, counts, and standard deviation only	213	94

The lite files are smaller but we may want to trim some more.

Other Subsetting Options

- OPeNDAP
- Simple Subset Wizard (SSW)

➔Both are good for smaller sets of variables

➔Do not work for large subsets

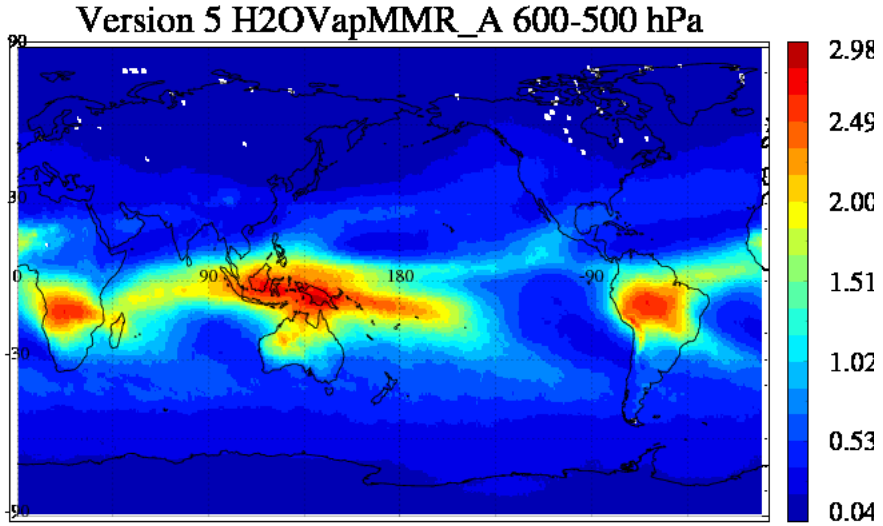
➔Output is not in original format HDF-EOS

Climatology Product

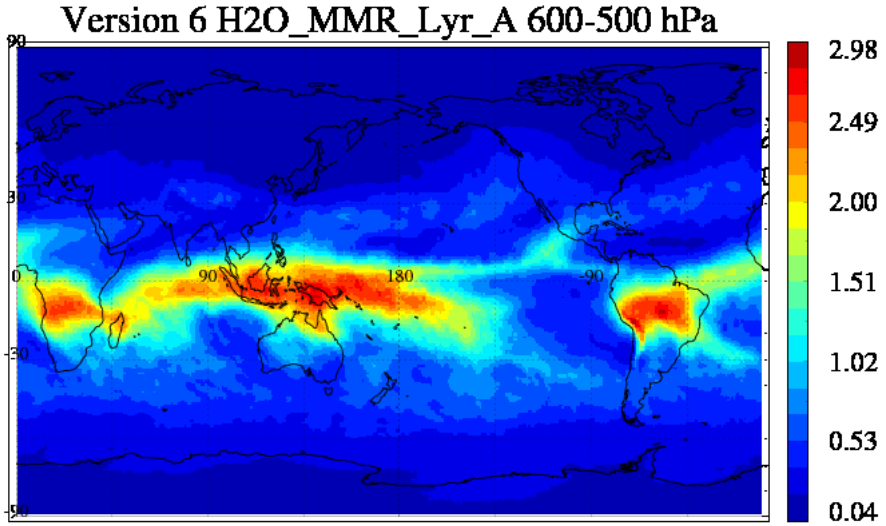
- Used in Giovanni for calculating anomalies
- Version 5 climatology in Giovanni was created offline using IDL
- Level 3 code can be run in “Climatology Mode” (e.g., daily, 8 day, monthly, **climatology**)
  - Consistent with Level 3
  - Can be used outside of Giovanni
  - 12 Files, 4.8 Gig

Climatology Product

Version 5



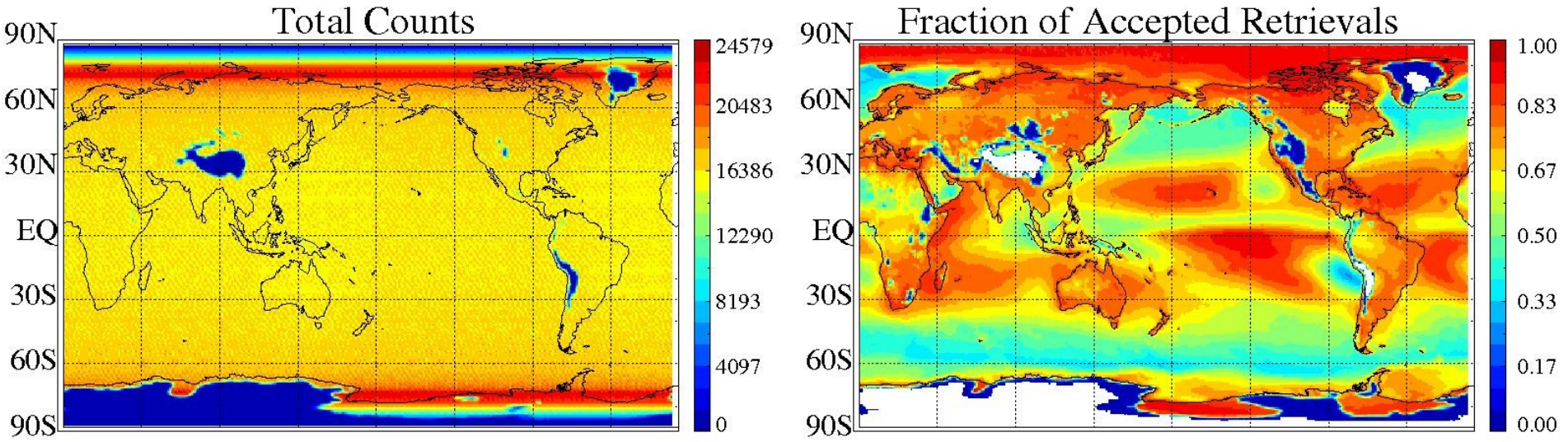
Version6



Water Vapor Climatology for January in the 600-500 hPa Layer. V5 is for 2002-2011 and V6 is for 2 years.

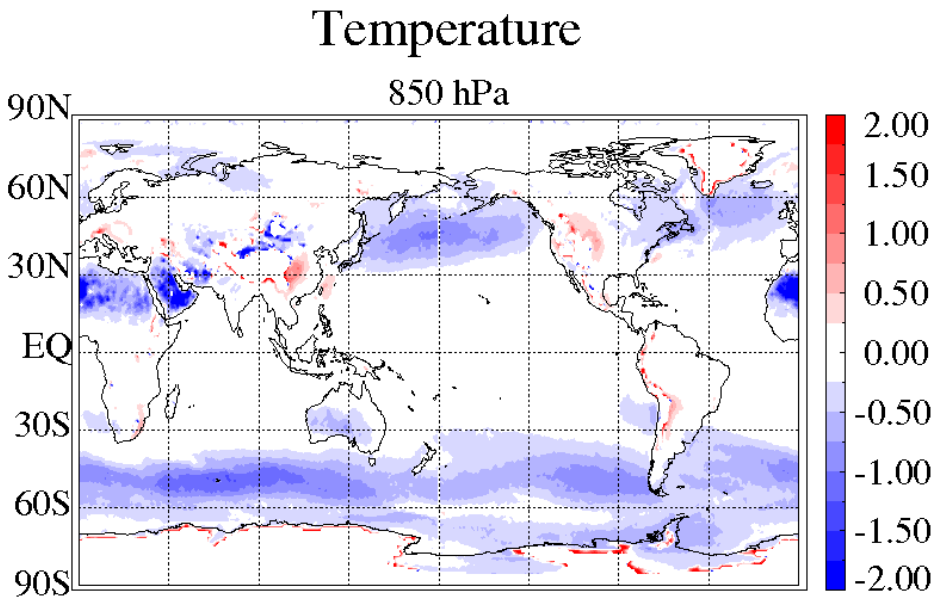
- Empty grid points over lakes have been filled in by the increase in yield and the new gridding methodology.
- The Version 6 Climatology appears to be more jagged. Because it is

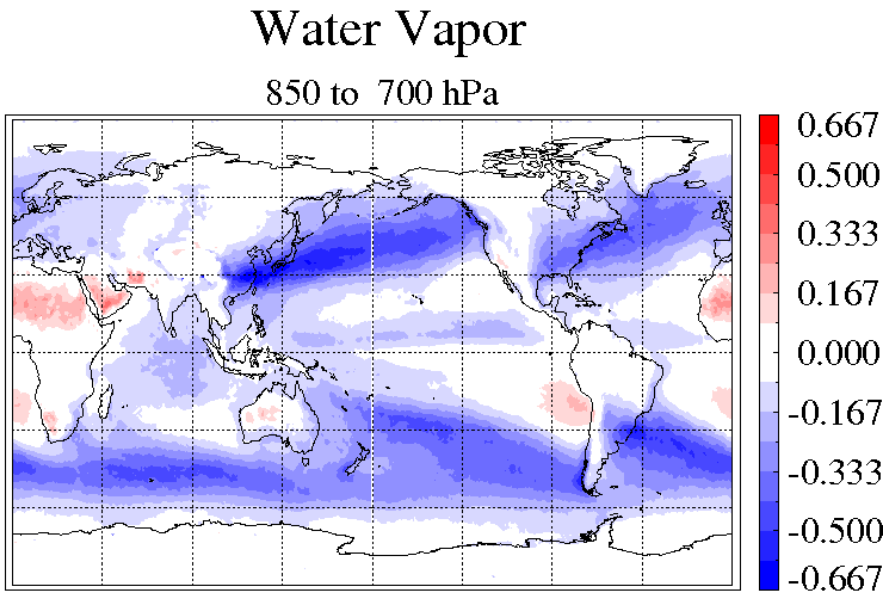
Climatology Sampling



The sampling bias can be separated into two components that we call **temporal** and **instrumental** sampling biases (Hearty et al. 2014). The remaining differences are **combined measurement uncertainties**. The figure shows the Version 5 sampling for Temperature at 850 hPa.

V5 Instrumental Sampling Biases





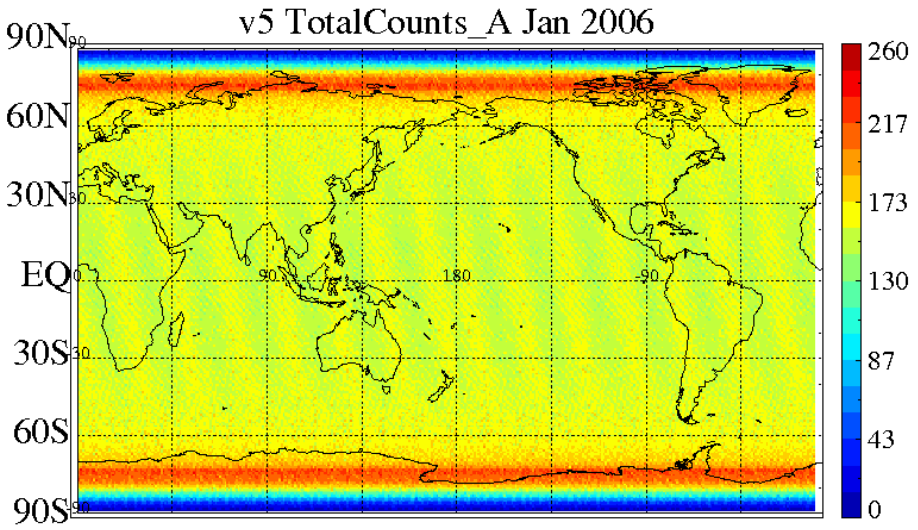
Using MERRA we showed that instrumental sampling biases can be up to ~ 1 K for temperature and ~ 20% for water vapor . The instrumental sampling biases are generally larger than the temporal sampling biases. Hearty et al. 2014, “Estimating sampling biases and measurement uncertainties of AIRS/AMSU-A temperature and water vapor observations using MERRA reanalysis,” DOI:10.1002/2013JD021205)

Version 6 Sampling

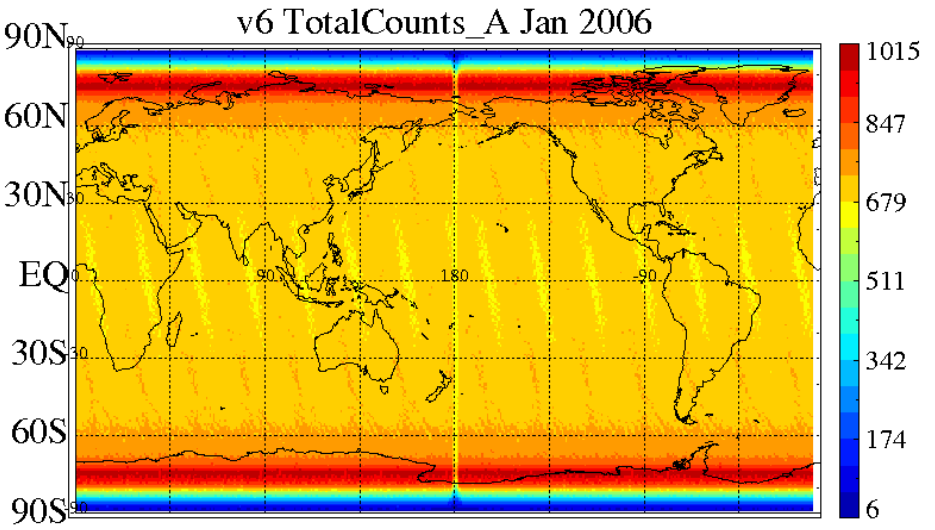
- Work is in progress
- The following slides show estimates for January 2006

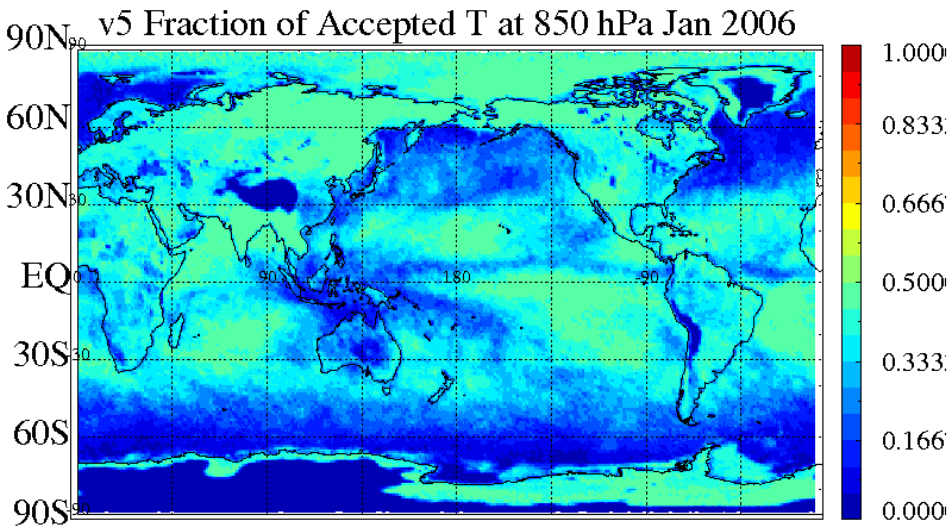
Version 6 has improved sampling

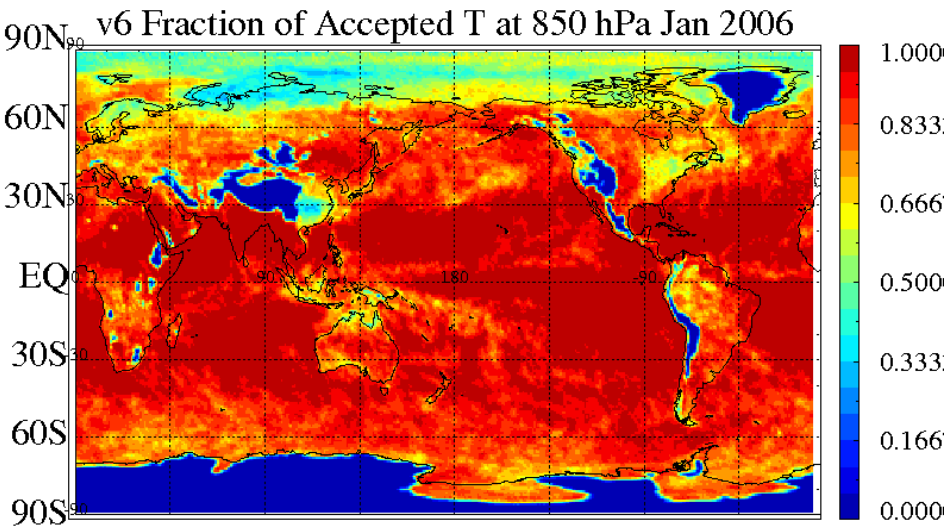
Version 5



Version 6



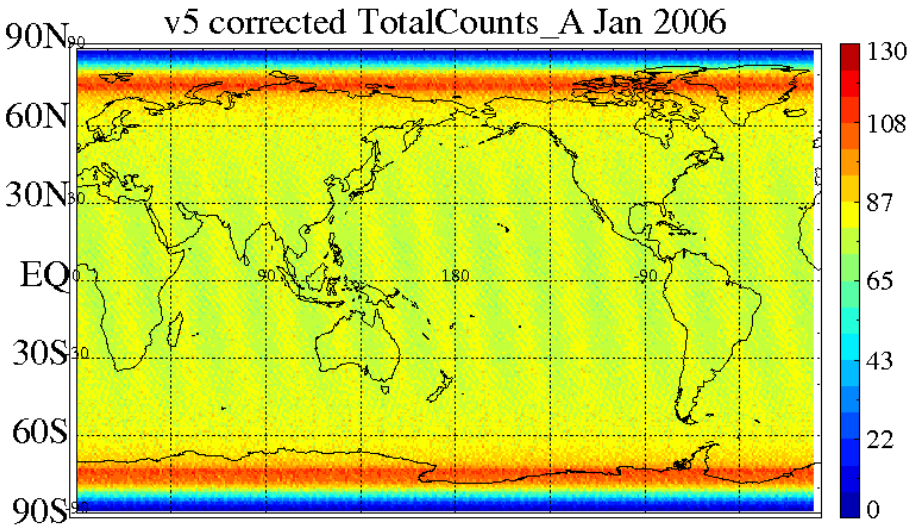




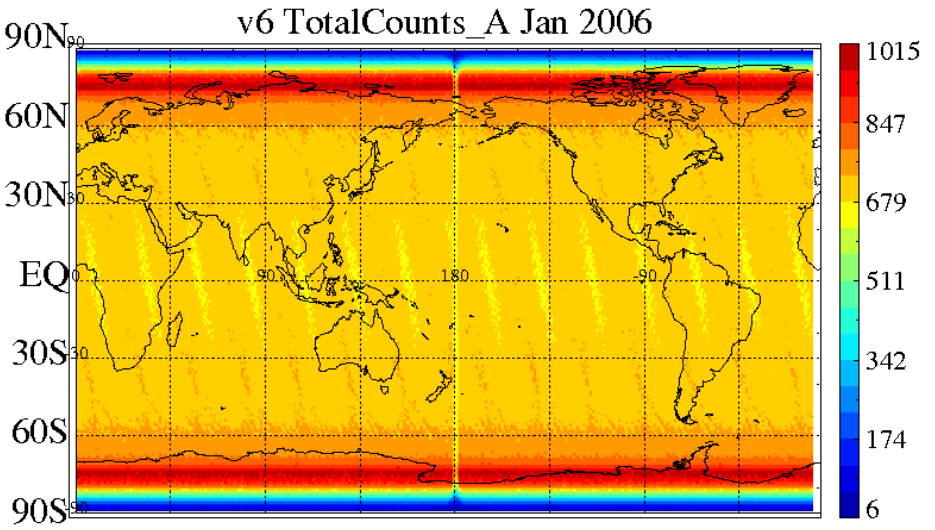
Bug in V5 totalcounts

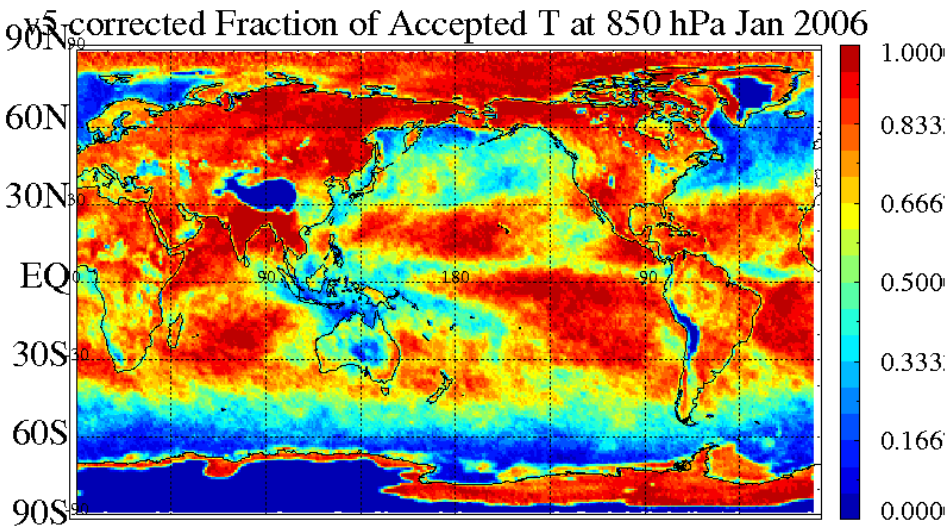
Version 6 has improved sampling

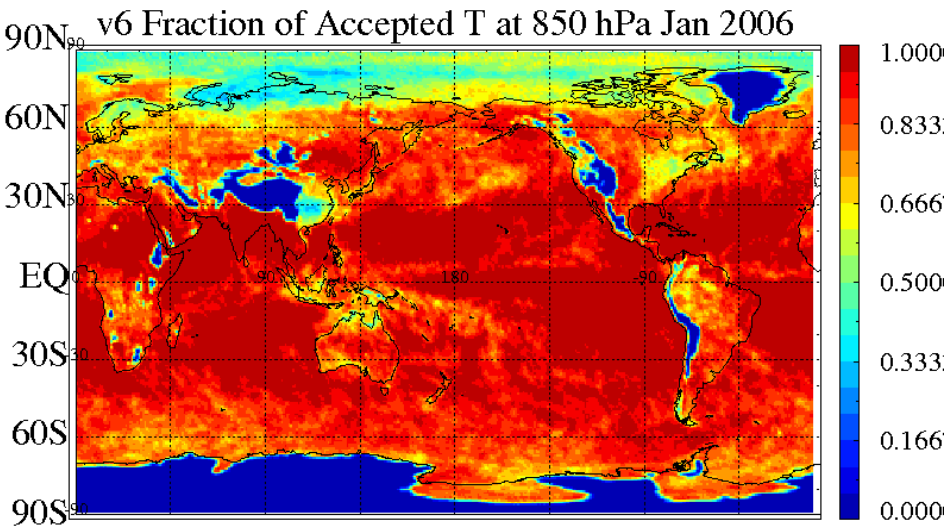
Version 5



Version 6







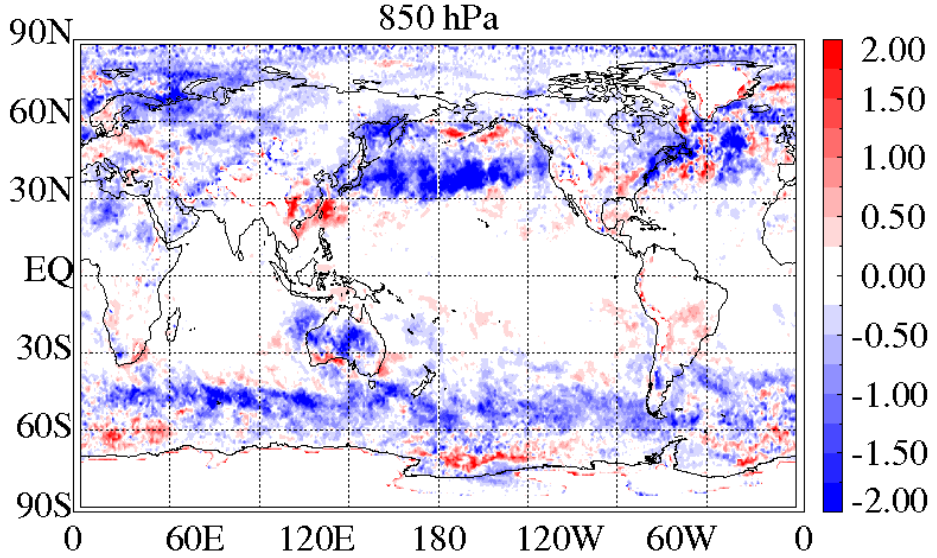
Version 5 had bug that allowed some temperatures below the surface.
Version 6 has an artifact along the dateline.

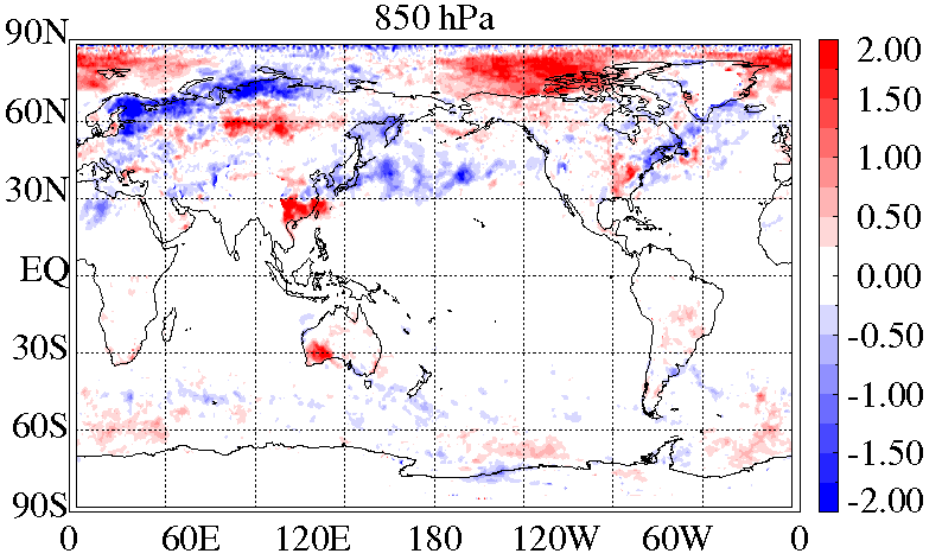
Version 6 Sampling Bias Estimates

Version 5

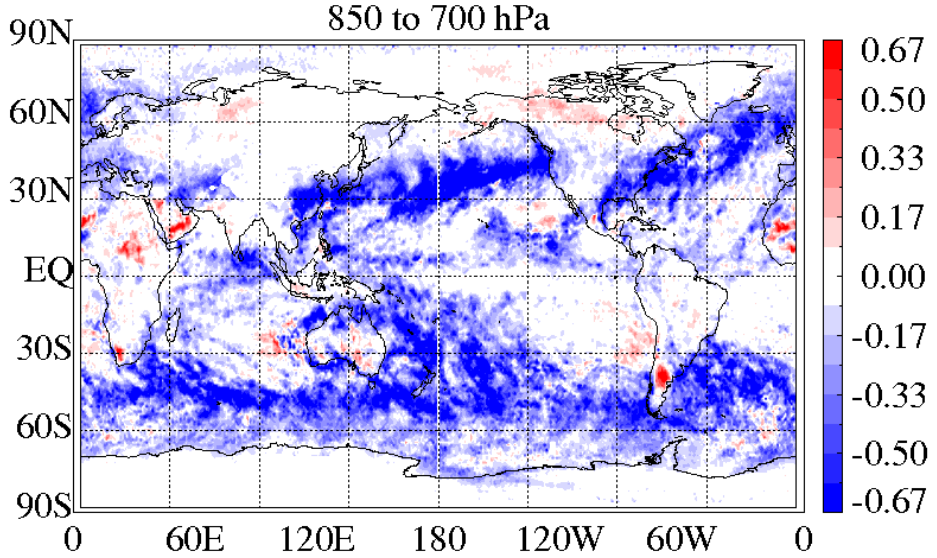
Version 6

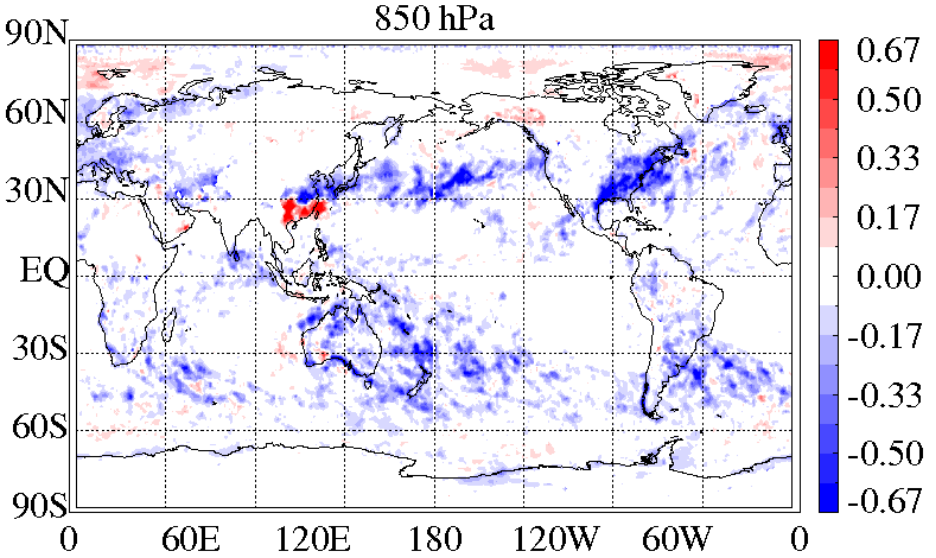
Temperature





Water Vapor

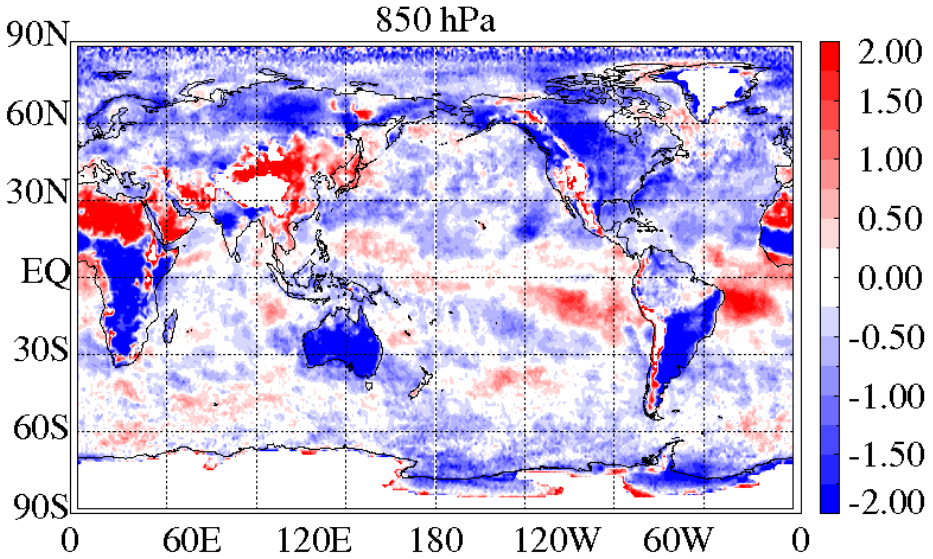




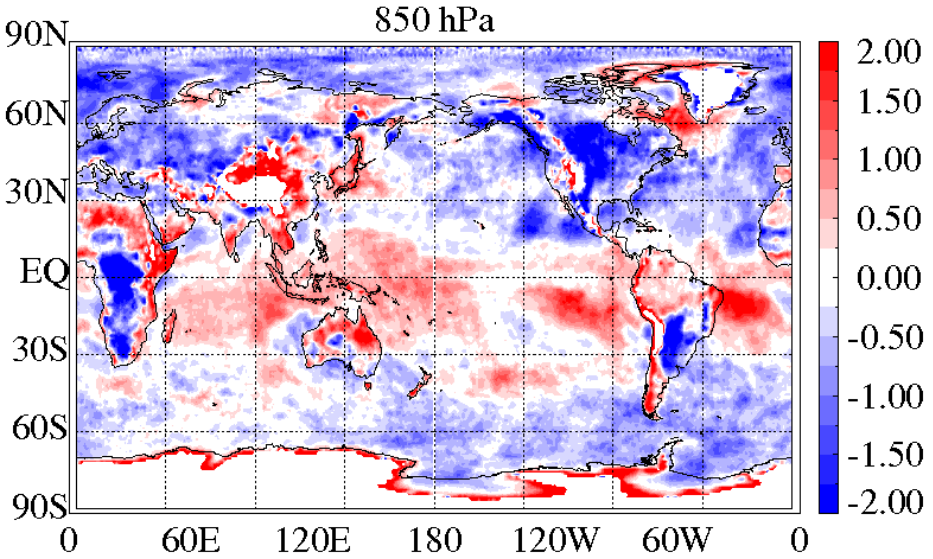
Caveat: Assuming MERRA has information where AIRS does not

Version 6 Measurement Errors

Version 5



Version 6



I only show temperature because Version 5 combined water vapor Error estimates are for layers while Version6 are for levels.

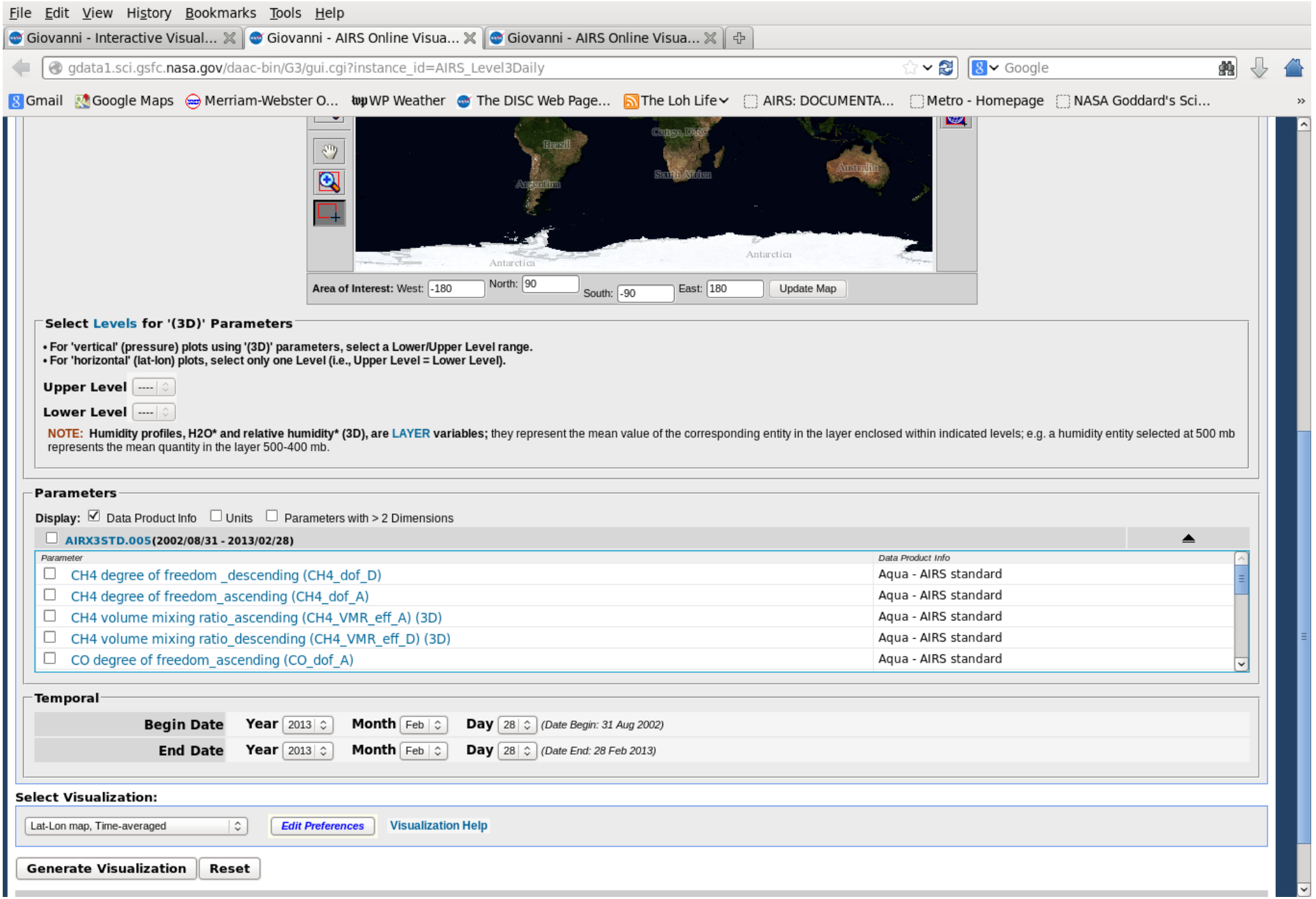
Giovanni-4

- Release of Giovanni-4 was roughly contemporaneous with AIRS Version6
- Version 5 is still available in Giovanni-3,
- Version 6 data is available in Giovanni-4

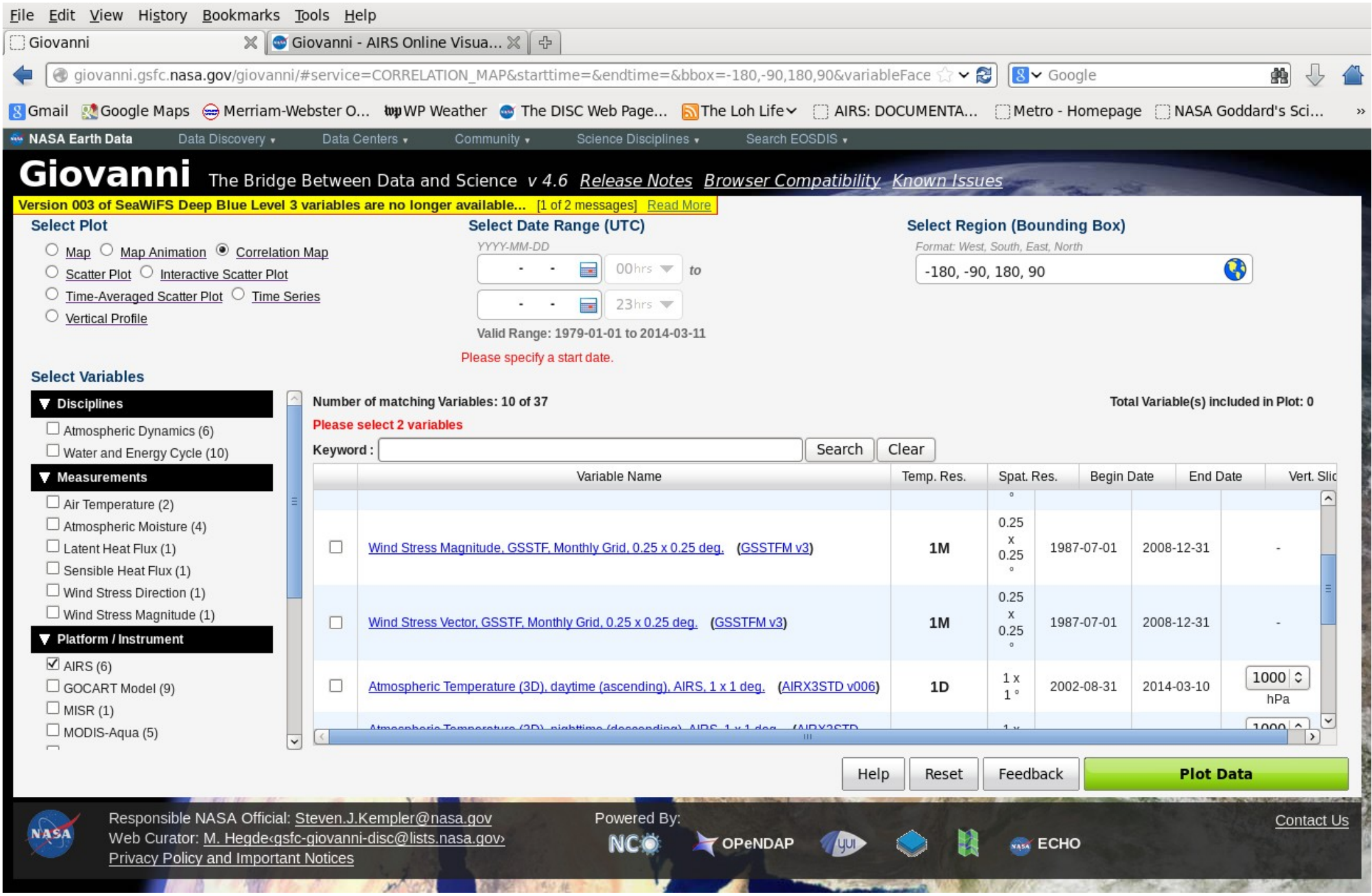
Giovanni-4 Changes

- Faster than Giovanni-3
- New Interface
- Ability to perform comparisons of different platforms
- Interactive Plots
- Seasonal options
- Does not have every variable. Users need to use the Feedback button to request variables or services that are not there.

Old Giovanni-3 Interface



New Giovanni-4 Interface



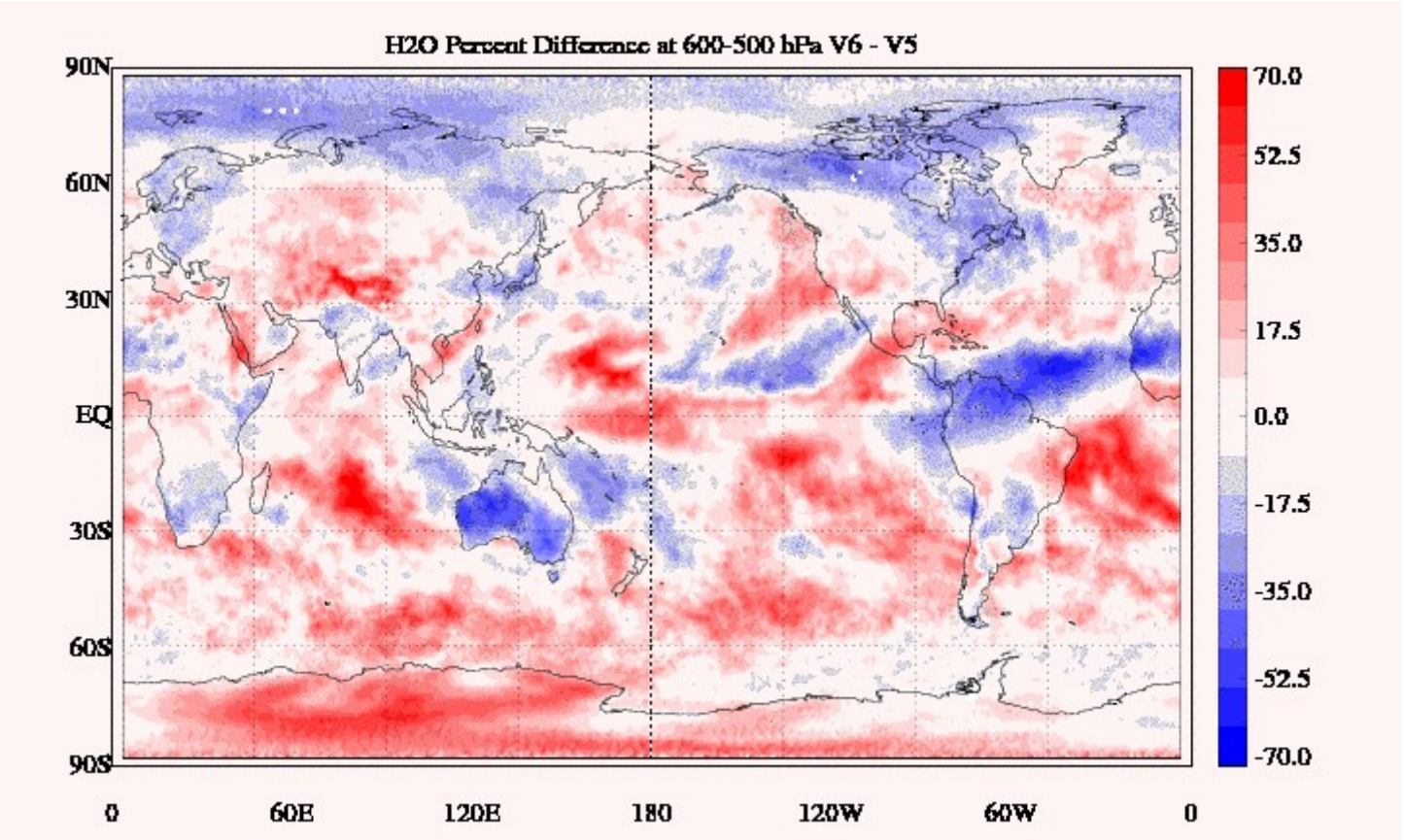
Variables in Giovanni

- Use the Feedback Button to request additional variables or features
- AIRS Level 3 Daily
  - Temperature
  - Water vapor
  - Relative humidity

Summary

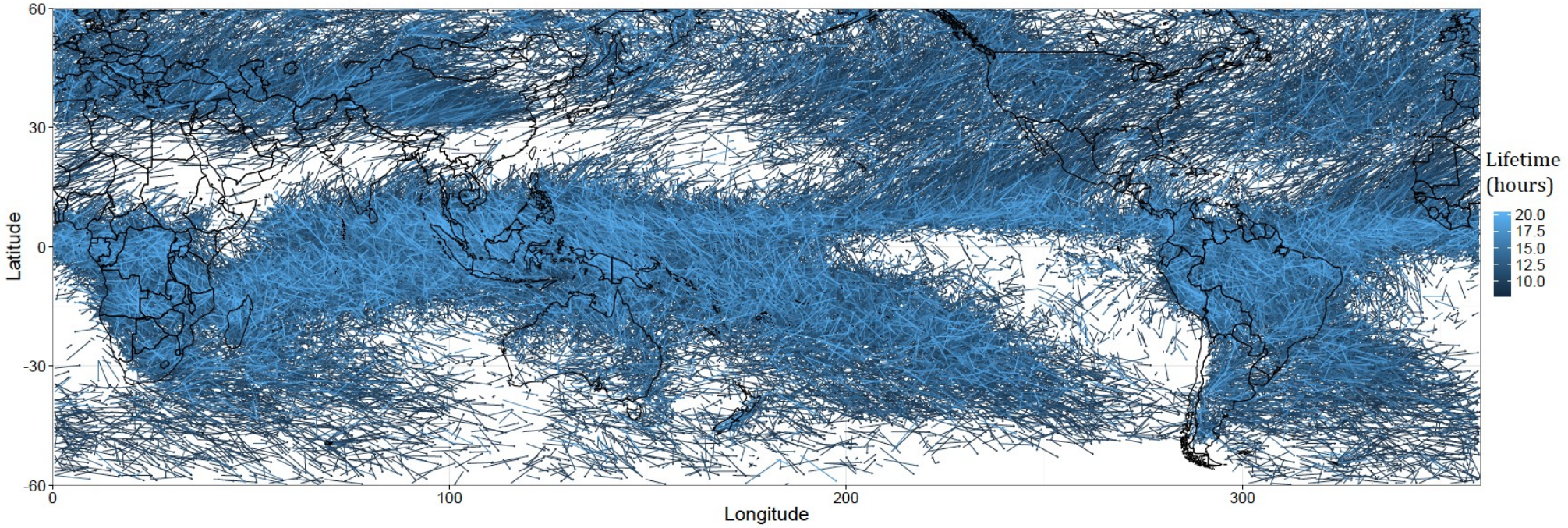
- Reprocessing is mostly complete
- New Products
  - Sounder PEATE- Available
  - Level 3 Lite- planned
  - Level 3 Climatology- planned
- AIRS Version 6 data is in Giovanni-4

Climatology



Differences can be due either to differences in sampling or differences in the Measurements.

Storm Tracks



Esmaili, R., Y. Tian, D. Vila, 2014: Global Tracking and Life Cycle Analysis of Distinct Storm Species using a Decade of Satellite Observations. American Meteorological Society, Atlanta, GA, Feb. 2-6, 2014. (2001-2012)